United Nations A/63/182

General Assembly

Distr.: General
28 July 2008

Original: English

Sixty-third session
Item 91 (c) of the provisional agenda*
General and complete disarmament

Problems arising from the accumulation of conventional ammunition stockpiles in surplus

Note by the Secretary-General

By its resolution 61/72, the General Assembly requested the Secretary-General to establish a group of governmental experts, no later than 2008, to consider further steps to enhance cooperation with regard to the issue of conventional ammunition stockpiles in surplus, and to transmit the report of the group of experts to the General Assembly for consideration at its sixty-third session. The present report is submitted pursuant to that request.

* A/63/150.

08-44177 (E) 290808

Report of the Group of Governmental Experts established pursuant to General Assembly resolution 61/72 to consider further steps to enhance cooperation with regard to the issue of conventional ammunition stockpiles in surplus

Summary

The Group of Governmental Experts established pursuant to General Assembly resolution 61/72 stressed that the problem of the accumulation of conventional ammunitions stockpiles in surplus is largely a result of inadequate stockpile management policies and practices and, consequently, must be considered within the broader context of stockpile management. The present report observes that inadequately located and poorly managed ammunition stockpiles pose an excessive risk because they can become unstable and threaten public safety with explosions or contamination. Moreover, unsecured and poorly managed stockpiles of ammunition may be easily diverted to illicit use, which can increase fatalities arising from various forms of armed violence.

The report presents a comprehensive view of problems arising from the accumulation of conventional ammunition stockpiles in surplus, noting that cooperation with regard to effective stockpile management needs to endorse a "whole life management" approach, ranging from categorization and accounting systems, which are essential for ensuring safe handling and storage and for identifying surplus, to physical security systems, and surveillance and testing procedures to assess the stability and reliability of ammunition.

The report contains a set of conclusions and recommendations that emphasize the need for greater international cooperation and assistance in order to address the problem of the accumulation of conventional ammunition stockpiles in surplus. The Group recommends, inter alia, the education and training of national stockpile management staff, the development of a set of technical guidelines in order to assist States in improving their national stockpile management capacities, and the improvement of knowledge resource management on ammunition technical issues within the United Nations system to ensure that States have ready access to appropriate technical expertise and guidance for the safe and secure storage of ammunition and the disposal of surplus stockpiles.

Foreword by the Secretary-General

It is very encouraging that the international community has taken it upon itself to address the problems arising from the accumulation of conventional ammunition stockpiles in surplus in a comprehensive and results-oriented manner. As the report of the Croup of Governmental Experts emphasizes, poorly managed conventional ammunition stockpiles threaten public safety and pose a risk to the security of States. While it is the prerogative of each State to determine the system of stockpile management that is most suited for its national defence and security purposes, the issue has been of growing concern to the international community because of the cross-border consequences of poorly managed stockpiles.

The most salient risk posed by the accumulation of conventional ammunition surpluses is that of explosive events in ammunition storage areas. News of ammunition depot explosions makes headlines several times in any single year. Often these events result in a large number of casualties, widespread destruction of infrastructure, and the disruption of the livelihood of entire communities. In addition to the immediate human suffering, such explosions can have terrible effects on the environment and, in States with limited means to finance the technically challenging clean-up costs, local populations, especially children, are all too often exposed to the risk of injury or death due to explosive ordnances that tend to litter large areas for extended periods of time after the explosion. Another serious risk that should not be overlooked is that of diversion of ammunition from unsecured and poorly managed stockpiles into the illicit trade. Ammunition diverted from national stockpiles can find its way into civil wars, insurgencies, terrorism, crime and other armed violence, thus fuelling national and regional instability and threatening the security of States.

The present report analyses, in a comprehensive manner, the various aspects of the problems arising from the accumulation of conventional ammunition stockpiles in surplus and correctly places them in the broader context of stockpile management. It outlines the basic components of an effective stockpile management system. Lastly, it provides a set of recommendations for action at the national, regional and global levels.

I wish to express my gratitude to the members of the Group of Governmental Experts for their hard work, which helps underscore the urgent need for States to put in place measures to improve the management of their national stockpiles and to enhance international cooperation and assistance in this area.

Letter of transmittal dated 25 July 2008 from the Chairperson of the Group of Governmental Experts established pursuant to General Assembly resolution 61/72 to consider further steps to enhance cooperation with regard to the issue of conventional ammunition stockpiles in surplus, addressed to the Secretary-General

The problems arising from the accumulation of conventional ammunition stockpiles in surplus are of growing concern to the international community. The magnitude is illustrated by the increasing frequency of accidental explosive events within ammunition storage areas worldwide, resulting in hundreds of lives lost each year.

The Group of Governmental Experts, which I had the honour to chair, was tasked to consider further steps to enhance cooperation with regard to the issue of conventional ammunition stockpiles in surplus. The Group argues strongly that comprehensive and effective management of conventional ammunition stockpiles is the only long-term means for States to prevent the growth of surplus stockpiles and to minimize the safety and security risks that are inherent to all conventional ammunition stockpiles.

The Group considered it important to recommend a set of mutually reinforcing measures in the areas of stockpile management, awareness-raising, capacity-building and international assistance as a basis for concerted and structured attention to the issue. These measures could be undertaken at the national, regional and global levels to address the accumulation of conventional ammunition stockpiles in surplus and enhance cooperation in this respect.

Through you I would like to thank the members of the Group for their very constructive approach and their contributions to the outcome of the deliberations of the Group. On behalf of the Group, I wish to express my appreciation for the support received from the staff of the United Nations Secretariat.

The Group has requested me to submit to you on its behalf the present report, which was adopted unanimously.

(*Signed*) Michael **Hasenau**
Chairperson of the Group of Government Experts
established pursuant to General Assembly resolution 61/72
to consider further steps to enhance cooperation with regard
to the issue of conventional ammunition stockpiles in surplus

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I. Problems arising from the accumulation of conventional ammunition stockpiles in surplus

1. The problems arising from the accumulation of conventional ammunition stockpiles in surplus are of growing concern to the international community.[1] The global stockpile of conventional ammunition in surplus runs into many millions of tons. Accurate data on the exact scale of surplus are still limited. The magnitude of the problem is nevertheless illustrated by the increasing frequency of accidental explosive events within ammunition storage areas worldwide, resulting in hundreds of lives lost each year.

2. The surplus problem is largely a result of inadequate stockpile management policies and practices and, consequently, must be considered within the broader context of stockpile management. States that do not effectively manage their national stockpiles are unable to monitor the quality and quantity of the conventional ammunition within them, and are therefore unable to effectively address the accumulation of surplus. Conventional ammunition stockpiles that are poorly managed pose an excessive risk because they can become unstable and threaten public safety with explosion or contamination. Unsecured and poorly managed stockpiles also allow the diversion of ammunition to illicit use, which can increase fatalities arising from civil wars, insurgencies, terrorism, crime and other armed violence.

3. Despite these risks, conventional ammunition stockpiles in surplus continue to receive limited international attention. Stockpile management has not been addressed comprehensively in most relevant regional and global instruments. There has been acknowledgement that the issue of ammunition should be addressed in a comprehensive manner as part of a separate process conducted within the framework of the United Nations.[2] At the national level, many States do not have the technical or financial capacity, nor the legislation governing the safe and secure storage of conventional ammunition. In other cases, national legislation or capacity may be insufficient to ensure effective stockpile management, or States may fail to implement its provisions fully.

A. Conventional ammunition stockpiles

4. The Group agreed that, in order to discharge its mandate, which was to examine the issue of problems arising from the accumulation of conventional ammunition stockpiles in surplus, it needed to consider the issue from the wider perspective of national ammunition stockpiles and their effective management. In this respect it also referred to paragraph 6 of General Assembly resolution 61/72, by which the General Assembly decided to address the issue of conventional ammunition stockpiles in surplus in a comprehensive manner. The Group therefore considered the full range of ammunition stockpiles within a State. The rationale for this was that the basic technical requirements for effective stockpile management are similar for different types of ammunition stockpiles. The Group, however, restricted its focus to stockpiles under Government control, including delegated control, and did not consider conventional ammunition in the possession of civilian

[1] See General Assembly decision 59/515 and resolutions 60/74 and 61/72.

[2] See A/60/88, para. 27.

users or civilian market retailers.[3] The Group agreed that, owing to differing constitutional and governmental systems, the term "government control" was understood to be, for the purposes of the entire report and its recommendations, in accordance with each State's respective constitutional system. Furthermore, while the mandate of the Group does not address the issue of explosives, other than to the extent that explosives are included in ammunition, the Group acknowledged that many of the issues regarding the safe handling, stockpile management and destruction of ammunition in surplus also apply to national stockpiles of explosives.

5. Inappropriately located, poorly managed or insecure national stockpiles of conventional ammunition can present an imminent threat to local communities and a security threat to societies and, ultimately, to national, regional and international security. Hundreds die every year because of failures to maintain and manage deteriorating ammunition stockpiles. Many more die through the illicit use of diverted conventional ammunition. The group of potential stakeholders in the issue of conventional ammunition in surplus is wider than often perceived. The problem posed by conventional ammunition in surplus is an issue that transcends international borders and deserves a response at the global level.

6. Clear and comprehensive data on the location and extent of ammunition stockpiles are difficult to find. States are often reluctant to disclose precise information about stockpiles for reasons of national security. Moreover, some States do not keep precise, centralized, or accessible records and accounts of existing stocks, including ammunition deemed surplus to national requirements. This lack of detailed information on stockpile levels makes it difficult to assess the national, regional and global dimensions of the problem and to develop a comprehensive policy to deal with it.[4] However, the Group agreed that scarcity of information on the nature of the problem should not preclude States from making use of, or improving, existing best practices and addressing the problem.

B. Stockpiles in surplus

7. The Group agreed that it was the prerogative of each State to assess its conventional ammunition requirements in accordance with its legitimate security needs. The Group recognized that it was for the individual State to decide on the structure, doctrine and equipment requirements of military and security forces (regular and reserve). Conventional ammunition stockpiles in surplus arise when ammunition is unsuitable for these requirements. This may be the result of several factors, including changing national security or defence requirements; security sector reform activities; changing equipment requirements; "shelf life" expiration; and ammunition being identified as unstable. States need to be able to define surplus stockpiles in relation to national requirements and make decisions on how to deal with them appropriately.

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[3] The Group took due account of the replies by Member States in response to the Secretary-General's request for views regarding the risks arising from the accumulation of conventional ammunition stockpiles in surplus and regarding national ways of strengthening controls on conventional ammunition; see A/61/118, A/62/166 and Add.1.

[4] See A/54/155, paras. 59-61.

C. Stockpile management and security

8. While it is the prerogative of each State to determine exactly which conventional ammunition stockpiles constitute a surplus, this is difficult where, because of resource and capacity constraints, many States lack the necessary stockpile management systems. Without effective management systems in place, it is extremely difficult for States to assess accurately whether the ammunition in their national stockpiles meet the quality and numerical requirements of their security forces.

9. Effective stockpile management systems cover all procedures and other activities regarding safe and secure accounting, storage, transportation and handling; key elements are the information systems and associated operating procedures that are designed to record, numerically monitor and verify ammunition. Since conventional ammunition contains explosive materials, the requirement for effective stockpile management is particularly urgent and justifies increased attention to broader stockpile management issues. The inherent hazards presented by many types of ammunition pose specific safe handling and storage requirements. Their disposal and destruction requires specialized skills and facilities.

10. The Group expressed particular concern about issues of stockpile security referring to the protection of ammunition against malicious actions. Sabotage, damage or tampering can increase explosive risk and consequently threaten the safety of the stockpile and local communities residing around it. Moreover, ineffective stockpile security leads to diversion, trafficking and the uncontrolled proliferation of conventional ammunition, for example, through theft or corruption. Diversion fuels national and regional instability and can pose a threat to the security of States. The effective management and security of stockpiles should therefore be considered not only as a significant priority in conflict prevention and peacebuilding, but also as a contribution to human security, in particular in post-conflict situations.

11. The Group observed that the use of conventional ammunition as the main charge in improvised explosive devices was a matter of serious concern for the international community. Ineffective stockpile management and poor physical security facilitate access by armed non-State actors to conventional ammunition and may constitute a source of supply for the construction of improvised explosive devices. Diverted conventional ammunition, and the explosives contained therein, can be used in a wide range of types of improvised explosive devices, ranging from anti-personnel booby traps and improvised mines, to roadside bombs and armour-piercing projectiles. Large-calibre ammunition, such as artillery shells and mortar bombs, are of particular concern with regard to construction of improvised explosive devices because they contain relatively large quantities of explosives.[5]

12. Peacekeeping operations have a particular stake in effective stockpile management and security, particularly in post-conflict environments. Conventional ammunition recovered during the disarmament, demobilization and reintegration programmes requires specialized handling and management. The presence of poorly managed stockpiles of conventional ammunition poses a threat to peacekeeping operations and a serious risk to peacekeeping personnel. Unsecured stockpiles may

[5] See A/52/298, para. 30.

be diverted for use in renewed hostilities, crime or terrorist purposes. Ammunition technical expertise is an essential component to be considered in planning and conducting peacekeeping operations.

13. The Group recognized that much bilateral, multilateral and international attention devoted to stockpile management had focused on man-portable air defence systems (MANPADS).[6] Some States have advocated the separate storage of the component parts of man-portable air defence systems in order to minimize the chances that a complete weapon may be diverted if security is breached.[7]

D. Stockpile safety

14. The Group was particularly concerned about the significant physical risk to communities from the presence of inappropriately located, and poorly stored and managed, stockpiles of ammunition. The damage, casualties and impact on communities of an explosion within an ammunition depot can be devastating. Moreover, the economic costs of explosive ordnance disposal clearance may be far greater than the cost of investment in the implementation of effective stockpile management and security procedures, including infrastructure development and stockpile disposal. The Group noted that a large number of explosive events in ammunition storage areas since 1997 had resulted in thousands of deaths and injuries.[8] These events comprise only those that are listed in open sources and probably underestimate the number of explosions by a wide margin. There are several possible causes for explosions in ammunition depots, including deterioration of the physical or chemical condition of the ammunition, unsafe storage practices, inadequate infrastructure, unsafe handling and transport practices.

15. The risk of explosions can be significantly reduced by the segregation of unstable stocks, enhancing capacity-building (in particular training), the development of appropriate ammunition management systems and the prioritization of surplus or unstable stocks for proper disposal. The impact in the event of an undesirable explosion can be reduced considerably by controlling the encroachment of the local population and increasing public awareness of the issue, where appropriate. The Group underlined that enhanced international cooperation and assistance, both financial and technical, would go a long way to help raise awareness of the problem and to make available the necessary resources to implement solutions.

E. Diversion

16. The Group considered the relationship between trafficking and the accumulation of conventional ammunition stockpiles in surplus and observed that all stocks of conventional ammunition, if not properly managed, are susceptible to

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[6] See General Assembly resolution 62/40, para. 4.

[7] See Organization for Security and Cooperation in Europe, *OSCE Handbook of Best Practices on Small Arms and Light Weapons: Best Practice Guide on National Procedures for Stockpile Management and Security, Annex C: Man-portable Air Defence Systems (MANPADS)*, FSC.DEL/33/06 (Vienna, 3 March 2006).

[8] Wilkinson, "Ammunition Depot Explosions", *Conventional Ammunition in Surplus: A Reference Guide*, James Bevan, ed., Small Arms Survey (Geneva).

the risk of diversion, regardless of where they are stored or deployed within the national stockpile.[6] Diversion is the unauthorized transfer of ammunition from the stocks of legal users to the illicit market. It takes many forms, ranging from large international transfers to low-level, localized theft and resale. It may affect all countries to some degree or another, and may occur at different points in the national stockpile chain. The negative effects of poor or ineffective stockpile security can be exacerbated by corruption, negligence and poorly implemented export and border controls.

17. Surplus ammunition stockpiles are particularly vulnerable to diversion as their illicit transfer will not directly affect the operational capability of national security forces, and often the surplus stockpiles are not as strictly monitored as operational stocks. Diversion tends to feed and sustain the activities of armed non-State actors, terrorist organizations and organized crime. It is one of the principal sources of illicit ammunition and explosives. In the light of these observations, the Group reiterated that effective accounting and physical security procedures must be applied to all conventional ammunition stockpiles in order to reduce the risks of diversion. Such diversions should be immediately investigated.

18. The Group also noted that ineffective stockpile management and security can severely undermine arms embargoes and sanctions regimes. Unsecured stockpiles may provide entities and individuals with ammunition, which they otherwise might have been denied access to. This possibility cannot be overlooked, particularly in conflict and post-conflict settings, where stockpile insecurity is commonplace. The Group therefore considered that effective stockpile management of conventional ammunition was a major component in ensuring the overall integrity and effectiveness of embargo and sanctions regimes.[9]

II. Management of conventional ammunition stockpiles

19. Comprehensive and effective management of conventional ammunition stockpiles is the only long-term means for States to prevent the growth of surplus stockpiles and to minimize the safety and security risks that are inherent to all conventional ammunition stockpiles. Effective stockpile management has a number of basic components, ranging from categorization and accounting systems that are essential to ensuring safe handling and storage and for identifying surplus, to physical security systems to discourage loss or diversion and surveillance and testing procedures that assess the stability and reliability of ammunition and its suitability for use by national military and security forces.

20. The Group considered that the following sections outline the basic components of an effective stockpile management system. In doing so, the Group endorsed a "whole life management" approach that is designed to ensure that every item of conventional ammunition is accounted for, and made subject to technical assessment, through its life cycle from production to use or disposal.

[9] See S/2005/83, paras. 104-116 and S/2006/750, para. 114.

A. National stockpile management planning

21. National stockpile management planning entails developing a set of policies, procedures and activities in order to minimize all risks related to national stockpiles of conventional ammunition. The term "national stockpile" describes the full range of separate ammunition stockpiles under State or delegated control. National stockpile management planning is applicable not just to large stockpile facilities, but throughout the national stockpile.

22. A core function of effective planning is to understand the specific demand for ammunition. This enables the ammunition procurement or management system to determine the quantity and types of ammunition needed to implement national defence and security strategies. States that use their national defence and security strategies to determine the demand for conventional ammunition also need to ascertain whether the supply of stockpiled ammunition meets the qualities and quantities demanded. Effective stockpile management planning is critical in this regard because it institutes a set of processes that enable States to maintain a running "balance sheet", which details at any time the types, condition and quantities of stockpiled ammunition.

23. National stockpile management planning should therefore encompass all activities that are designed to ensure: (a) that the condition and size of the national stockpile is accurately understood (e.g. effective classification, accounting and records of stock movements); (b) that the condition of stockpiles is regularly assessed (through physical and chemical surveillance and proof); and (c) that stockpiles are secure from any activity that might detract from the national balance of conventional ammunition (e.g. theft of munitions or accident leading to destruction). The successful implementation of these activities not only ensures efficient use of the national stockpile, but also combats the growth of surpluses and minimizes the risks of ammunition becoming unstable or subject to loss or theft.

B. Ammunition classification systems

24. Any national stockpile consists of a range of function-specific stockpiles. These require effective classification if States are to make accurate supply versus demand assessments of the types and quantities of conventional ammunition within national stockpiles. Classification systems vary, but in the most effective cases they define, inter alia, operational ammunition (necessary to support the routine operations of security forces), war reserve ammunition (necessary to support operations during external conflict or general war), training ammunition, ammunition awaiting disposal and smaller stockpiles such as experimental ammunition. Many States remain unable to ascertain these or similar categories, and it is difficult for them to accurately gauge realistic ammunition requirements, such as quantities that might be required in the future or whether there is an excessive surplus.

25. Classification systems are also required to assign handling and storage procedures to particular types of ammunition and their component parts. Many States have adopted ammunition classification systems according to their different requirements. One such comprehensive international system for the classification of ammunition is contained in the Globally Harmonized System of Classification and

Labelling of Chemicals (GHS).[10] The System classifies chemicals, including explosives, by types of hazard and proposes harmonized hazard communication elements, including labels and safety data sheets. It aims to ensure that standardized information on physical hazards and toxicity from chemicals is available in order to enhance the protection of human health and the environment during their handling, transportation and use. The System also provides a basis for harmonizing rules and regulations pertaining to chemicals at the international level.

C. Ammunition marking systems

26. The marking of ammunition and its logistic packaging is a critical component of effective stockpile management. Marking enhances safety, directly supports accurate accounting and may assist in tracing. Marking can differentiate items of ammunition by type, role, age and component parts, including explosives and propellants. Effective marking enables personnel to identify, classify and count items within the national stockpile. Marking may also include hazard information, which indicates necessary handling and storage procedures to minimize the risk of instability and explosion.

27. It is in the interest of all States to ensure that the marking of ammunition and its logistic packaging is systematic and easily recognizable. Many manufacturing States systematically mark items of larger conventional ammunition at the time of production with information including the role of the item in question, the lot and batch number and the propellant or explosive composition. Most major shortcomings arise when personnel are not sufficiently trained to understand ammunition markings, or when marking information pertaining to handling and storage is ignored. The Group recognized that small arms ammunition also is often stamped with manufacturer and date marks with more detailed information applied to the packaging, for practical reasons related to ammunition size and quantities involved.

D. Ammunition accounting systems

28. Ammunition accounting refers to the operating procedures that are designed to record, numerically monitor, verify, issue and receive stocks of ammunition. Such systems are often supported by complex information management systems, but they may also operate along far simpler lines. In basic terms, an ammunition management system should be able to document the exact location, condition and role of any ammunition within the national stockpile, throughout its life, from production, to use or disposal. Ammunition classification and marking systems function effectively only when States institute accurate ammunition accounting systems. Accounting systems are used to record qualitative and quantitative changes to the national balance of conventional ammunition. These systems are essential because they enable States to make rapid assessments of the suitability of the types and quantities of national stockpiles to the national demand for ammunition. In addition, they allow States to accurately ascertain the location of specific stockpiles and potential instances of loss or theft.

[10] See ST/SG/AC.10/30/Rev.2.

29. Effective ammunition accounting allows States to tailor the supply of ammunition to immediate and projected requirements. In so doing, accurate accounting has the potential to make cost savings for States, as they improve the management of ammunition. Global standards of ammunition accounting vary widely. Some States maintain highly effective accounting procedures. In many others, however, accounting procedures are inadequate. Inadequate accounting often allows the undetected growth of surplus stockpiles and does not maintain a record of the condition of the ammunition. Furthermore, when accounting is substandard, the loss or diversion of ammunition can remain undetected and therefore unaddressed.

E. Inspection, surveillance and proof

30. A national physical and chemical inspection regime is an essential part of effective stockpile management and is required for ensuring the safety, reliability and operational effectiveness of ammunition within national stockpiles. From a safety perspective, inspection regimes are necessary because the propellant in some types of ammunition is inherently unstable and requires the addition of a stabilizer to the propellant. Stabilizers, however, deplete and their content levels need to be monitored regularly to prevent the propellant from becoming unsafe. Inspection regimes also enable States to make realistic assessments of the safe shelf life of ammunition. Where feasible, shelf life can be extended according to the results of thorough physical and chemical inspection, thereby reducing replacement costs and saving expenditure on new acquisitions.

31. Inspection regimes consist of two activities: "in-service proof", which is the physical testing of ammunition and its components; and surveillance, which comprises regular chemical testing. Surveillance in particular requires the necessary expertise to evaluate samples of explosives and propellants, in addition to access to master sample records held by the manufacturer of the ammunition in question. Both surveillance and proof also require accurate ammunition accounting systems and should form part of the "whole life management" of conventional ammunition. Standards of effective surveillance and proof vary considerably among States. Many States do not have the required technical expertise to institute regular surveillance and proof systems. A failure to adopt surveillance and proof systems places security force personnel at risk, increases the propensity for accidents during training and operations, and leads to increased fatalities and injuries. Furthermore, poor quality conventional ammunition can adversely affect the performance, safety and confidence of security forces, including police and peacekeeping personnel.

F. Stockpile locations and explosion danger areas

32. The physical location of stockpiles is a critical decision in national stockpile management. Risks can be minimized by designing and locating stockpiles based on a full consequence analysis and technical assessment of the potential effect of an accidental explosive event. Maintaining an explosion danger area around stockpiles is the safest way to minimize risks to people, infrastructure and the environment. Danger areas are designed to control access to places that are most likely to suffer the damaging or injurious effects of an accidental stockpile explosion. Explosion danger areas, however, do not guarantee absolute immunity from explosion propagation, damage or injury. It is for States to decide on the level of tolerable risk,

which should be minimized as far as possible, and then use this measure to define the size of danger areas.

33. Decision makers are increasingly able to use a number of proven quantity distance systems that are designed to estimate the potential explosive effects of an accident at varying distances and directions. These systems include calculations derived from the quantity and type of ammunition stored, the design of the depot and the explosive propagation distance in the event of an explosion. Ongoing use of a quantity distance system is an effective method of evaluating risks when the types and quantities of ammunition stored at a given stockpile location change in response to increasing demand. The growing number of people killed and injured in stockpile explosions illustrates that decisions on stockpile location should require a full technical assessment of the potential impact of an accidental explosion. The potential impact of natural disasters, such as earthquakes and flooding, also needs to be taken into account when deciding on the location of an ammunition depot. New facilities should not be placed in areas of known risk, while older facilities may require adequate infrastructure protection or upgrading. Stockpile location decisions are not a one-time activity and need to be revisited when the types and quantities of ammunition stored in any given location change. In some States, ammunition depots are currently within urban areas, due mainly to population growth, which considerably increases the potential number of casualties in case of accident. Ideally, in such cases, these stockpiles should be relocated. If it is not feasible to build a new depot in a remote location, it might be possible to relocate or segregate stocks within the depot to reduce the risks of explosion en masse.

G. Physical storage conditions

34. The infrastructure and physical location of stockpiles, e.g. buildings, bunkers, security fences and intruder detection systems, also influence the safety and security of ammunition in storage. Environmental factors such as humidity, temperature changes, peak temperatures and protection from wind and rain will all impact on the physical and chemical properties of conventional ammunition in storage and hence its safety and shelf life. Ideal ammunition storage infrastructure consists of specially designed, strengthened storehouses with temperature and humidity controls, intruder detection systems and effective danger areas. Conventional ammunition may be, and often is, stored safely under "field conditions", but storage under such conditions inevitably reduces the in-service life of ammunition.

H. Transport of ammunition

35. Conventional ammunition differs from other military stores because of its specific hazards. Many States have adopted specific handling procedures to minimize safety risks during transport. One such set of guidelines for the safe handling of conventional ammunition is contained in the United Nations *Recommendations on the Transport of Dangerous Goods: Model Regulations*.[11]

36. The dangers inherent to transporting ammunition are greater when decaying and potentially unstable ammunition is transferred from one location to another.

[11] See ST/SG/AC.10/1/Rev.15.

Existing guidelines on the transportation of dangerous goods provide ready standards for minimizing transportation risks. However, deciding whether ammunition is "safe to move" or not requires technical evaluation. When stockpile management systems are ineffective, technical data on the condition of the ammunition may provide a basis as to whether ammunition is safe to move, but this should be supported by physical inspection. These factors also have an impact on the disposal of conventional ammunition. Ammunition may be too unsafe to relocate to a dedicated demilitarization facility, and must therefore be destroyed as close to the storage location as possible, but only in areas or facilities within the storage area specifically designated for that purpose.

I. Stockpile security systems

37. National stockpiles may become a target of malfeasance in two ways. First, stockpiles with insufficient physical security measures are prone to illegal entry or attack, resulting in an increased risk of sabotage, theft or mass looting. Secondly, personnel working within them are potentially better placed to organize theft or diversion from the stockpile. The risk of insider theft is greater when oversight is weak and States fail to institute effective accounting systems and regular stock audits. Ammunition that is easy to transport and conceal is particularly at risk of theft, loss and diversion, including in particular integrated ready-to-fire weapon/ammunition systems, such as man-portable air defence systems and anti-tank guided weapons. However, armed non-State actors frequently use larger conventional ammunition items, such as artillery shells and rockets, in addition to demolition stores, to manufacture improvised explosive devices. All types of conventional ammunition are therefore prone to diversion and illicit use.

38. Controlling access to stockpiles is the most effective way to ensure the physical security of ammunition. States can effectively deter unlawful access by creating layered security systems, including fences, lighting systems, well-designed storage bunkers, locks, and visual and audio surveillance systems where feasible, and by instigating regular patrols and rapid response forces in and around the stockpile storage area. Any infrastructural security measures should, however, be supported by detailed operational procedures, which schedule tasks and specify the responsibilities of the personnel working within stockpiles.[12] States can also enhance within-stockpile security by instituting a series of "checks and balances" measures to ensure that personnel working in the stockpile storage area have neither the incentive nor the opportunity to divert ammunition.

J. Stockpile disposal

39. There are four methods of surplus ammunition disposal: transfer through sale or gift, increased use in training, deep sea dumping and destruction. The transfer of surplus conventional ammunition is a cost-efficient option for States, if the ammunition is of good quality and States abide by adequate transfer controls. However, if the ammunition is of poor quality, or the recipient State does not have

[12] See Organization for Security and Cooperation in Europe, *OSCE Handbook of Best Practices on Small Arms and Light Weapons: Best Practice Guide on National Procedures for Stockpile Management and Security*, FSC.GAL/14/03/Rev.2 (Vienna, 19 September 2003).

an effective stockpile management system in place, then exporting States may be in effect "offloading" safety or security risks when they sell or donate surpluses. The use of surplus in training may be an effective option if the ammunition is of the required type and remains serviceable, but this is often not the case. This technique is normally used when a complete weapon system reaches the end of its useful life, and therefore the significantly increased wear on the weapon system's main armament is acceptable. Deep sea dumping is prohibited to States parties to a number of conventions,[13] is not an option for many States and may increasingly become a politically and environmentally unacceptable option.

40. States incur costs when they retain surpluses of conventional ammunition. Surpluses increase the gross volume of national stockpiles and thereby increase storage costs, in addition to multiplying the inherent safety and security risks associated with stockpiling conventional ammunition. Cost benefit analysis requires that States are able to accurately identify the real costs of storage and security. Storage costs include, inter alia, staff salaries, capital depreciation of infrastructure and assets, operating costs and fuel and electricity charges. A cost benefit analysis of these costs over an identified storage period, compared against the costs of disposal, cannot only demonstrate long-term cost savings; it can also address the human and financial consequences of an explosion within an ammunition depot.[14] In many cases, surplus disposal, rather than retention, appears therefore to be a cost-effective, safe and secure option.

K. Stockpile destruction

41. Security concerns and practical considerations, including safety, indicate that the most effective option usually is the physical destruction of surplus or obsolete ammunition. This should preferably be achieved using an environmentally sound demilitarization process whereby ammunition is stripped down to its component parts and compounds, which are then recycled. Surplus destruction or demilitarization removes many of the safety and security risks associated with surpluses, including problematic transfers and re-transfers, accumulations of unstable ammunition, and stockpiles that are at risk of theft or sabotage. The logistics of destruction or industrial demilitarization of conventional ammunition can, however, be very challenging because of the inherent risks and hazards during processing operations and the large tonnages and quantity of individual items involved. Decisions to destroy need to recognize a number of factors that can affect the efficiency and cost of the process, including the types and volumes of ammunition earmarked for destruction, the physical condition of the ammunition, the methods of destruction currently available and factors relating to domestic technical destruction capacity.[15]

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[13] *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter* (London Convention) (London, 1972); the Oslo Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (1998); the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) (Paris, 1998).

[14] United Nations Institute for Disarmament and Research, *Costs of Disarmament — Cost Benefit Analysis of SALW Destruction versus Storage* (Geneva, 2006).

[15] See S/2000/1092, paras. 34-43.

42. A wide range of destruction techniques and technologies is available. They range from simple destruction by open detonation to demilitarization using sophisticated industrial processes. The most efficient and cost-effective method to use depends on the types of ammunition to be destroyed and potential economies of scale. Industrial demilitarization is more technically complex, and combines production, manufacturing, chemical and explosive engineering skills. Proven available techniques and technologies include, inter alia, rotary kiln incineration, plasma arc incineration, mechanical and robotic disassembly, mechanical breakdown (e.g. remote cutting or crushing), cryofracture and hydro-abrasive cutting.[16]

43. A range of factors should be considered during the planning process when selecting the destruction options for the different types of conventional ammunition. No one destruction technique or technology will be suitable for all conventional ammunition types in a surplus stockpile and a range of techniques and technologies will be needed. To a degree these can impact on each other in terms of demilitarization efficiency, and therefore an integrated demilitarization capability will be necessary. The range of techniques and technologies available, when compared to the large number of conventional ammunition types, means that the range of options for industrial demilitarization processes becomes quite complex and requires effective planning if the most cost-effective and efficient overall system is to be developed.

44. Industrial demilitarization often allows for recovery and recycling of materials, which can help to offset operating costs. Professional advice on scrap metals is advisable during planning. Waste explosive and propellant can be converted for commercial use, although the income from this is limited owing to the very low relative cost of commercial explosives. However, the unpredictability of the level of cost recovery from the waste products of industrial demilitarization means that recovery and recycling should be considered a means of reducing operating costs, and not as a means of subsidizing initial or subsequent infrastructure investment.

45. Because of pressure from procurement agencies, some ammunition manufacturers have begun to examine the concept of "design for disposal", thereby allowing for improved recycling and more efficient, cheaper future ammunition destruction and demilitarization systems. To be most effective this requires technical cooperation between the ammunition manufacturers and the bodies and agencies responsible for destruction and demilitarization to ensure that, wherever possible, conventional ammunition is designed to be destroyed by the utilization of already available technologies. Although design for disposal is unlikely to impact on current surplus stockpile destruction requirements, if embraced more widely, it could have a significant impact on demilitarization in the future.

[16] Annex 3 to this report provides an indicative list of demilitarization techniques that are currently available. While the Group did not discuss the contents of the annex, it felt that it would be useful background information to support the report.

III. Cooperation with regard to conventional ammunition stockpiles in surplus

46. Many States continue to retain excessive quantities of conventional ammunition in surplus. Often this is because they do not have the stockpile management systems in place to differentiate between required and surplus conventional ammunition stockpiles. In other cases States retain surplus either due to insufficient national capacity to destroy or demilitarize them or by simply neglecting the problem. International efforts with regard to the management and security of ammunition stockpiles have increased in recent years. Capacity-building with regard to stockpile management, as well as destruction and industrial demilitarization operations, has often been orchestrated in cooperation with international donors, which provide assistance either through bilateral or multilateral channels. While there have been numerous successful donor-assisted projects and programmes, including technical advice, training and financial support, the Group observed that the scale of cooperation appears to be limited and the number of major donors is still relatively small.[17]

47. The Group considered that, owing to the nature of conventional ammunition, specific resources and cooperation programmes are required, so that surplus ammunition can be destroyed in a safe, rapid, transparent and environmentally benign way. Cooperation needs to encompass training, financial and technical assistance, advice on infrastructure improvements, and advice on technical and administrative measures and record-keeping. Efforts to promote good practice need to be complemented by projects and programmes that address the greatest risks on an emergency basis, owing to the scale and imminence of the problem of insecure and unsafe ammunition stockpiles. The Group also observed that encouraging wider donor participation, funding and support will require greater efforts on the part of national Governments to identify the scale of their surplus stockpiles and their disposal or destruction needs.

A. Regional initiatives

48. At the regional and subregional levels, a range of initiatives and mechanisms to support stockpile management and surplus destruction of conventional ammunition has been developed. Such regional initiatives are often not targeted at wider conventional ammunition stockpile management or surplus aspects. They tend to be either constrained to conventional ammunition within a small arms and light weapons perspective or deal with specific security considerations. The Group noted that a number of such regional initiatives exist. It also noted that an example that encompasses all categories of conventional ammunition is provided by the Organization for Security and Cooperation in Europe (OSCE) Document on Stockpiles of Conventional Ammunition (2003).[18] A list of regional initiatives is contained in annex I to the present report.

[17] See General Assembly resolution 61/72, para. 3.

[18] See Forum for Security Cooperation, FSC.DOC/1/03 (November, 2003).

B. International cooperation

49. A wide range of technical cooperation programmes and projects related to stockpile management, the identification or surpluses and the destruction of conventional ammunition is being implemented at the regional and bilateral levels. These include, inter alia, assistance in the development of stockpile management and destruction programmes, financial support, assistance in ammunition technical assessments, the development of operational support tools, and training in stockpile management and security. This work has been initiated due to the recognition by a range of stakeholders that the issue of ineffective conventional ammunition stockpile management can impact on lives and livelihoods, may have an adverse impact on national and regional security, and has significant financial and environmental costs.

50. The Group noted different examples of assistance being extended by relevant mechanisms. These included projects and programmes implemented by the United Nations Development Programme (UNDP) (in recognition of their concern over the potential linkage between development and stockpile management) and those initiated in the context of the OSCE Document on Conventional Ammunition[19] and the North Atlantic Treaty Organization (NATO) Partnership for Peace Trust Fund projects. The Group underlined the value of international cooperation in a national, subregional or regional context. Regional approaches were proving to be effective and particularly advantageous also in terms of small donor engagement in larger projects and programmes implemented under a regional umbrella. The Group recognized the role that the United Nations Regional Centres for Peace and Disarmament could play. It referred to the United Nations Regional Centre for Peace, Disarmament and Development in Latin America and the Caribbean, which has supported a range of activities, including stockpile management seminars, assessment missions and the initiation of the 2006 Lima Challenge.[20]

C. Lessons learned

51. The Group was of the view that the most effective projects and programmes are those that balance the requirement to support security, stockpile management and destruction across the whole life cycle of the ammunition. Experience with regard to developing national ammunition storage and destruction capability suggests that often the development of complete operating systems, not just the procurement of technical equipment, is required. However, the Group acknowledged several obstacles to the widespread installation of comprehensive systems to effectively address stockpile management and the destruction of surplus ammunition. These include: (a) safe, effective, efficient and environmentally benign ammunition destruction programmes are necessarily expensive and beyond the current resources of many States, while available donor finance is limited; (b) a

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[19] See Organization for Security and Cooperation in Europe, *OSCE Document on Stockpiles of Conventional Ammunition*, FSC.DOC/1/03 (November, 2003); *OSCE Handbook of Best Practices on Small Arms and Light Weapons: Best Practice Guide on National Procedures for Stockpile Management and Security*, FSC.GAL/14/03/Rev.2 (September, 2003).

[20] The Lima Challenge on Firearms and Ammunition Destruction and Stockpile Management challenges States in the region to destroy surplus and decommissioned firearms and ammunition and to improve stockpile management.

shortage of technically qualified staff experienced in the development of "best practice" destruction projects and programmes; and (c) little or no budget for replacement ammunition in many States, which often dissuades States from destroying surpluses, no matter how old and potentially unstable the ammunition may be.

52. Institutional capacity-building is only effective if supported by development of national staff skills, which requires a combination of education and training. While basic training can be provided during specific projects and programmes, the education required for individuals to develop and maintain effective and safe ammunition management systems is necessarily lengthy and hence expensive. Projects and programmes for the destruction and demilitarization of conventional ammunition should always address the training needs of national staff with regard to wider stockpile management issues as set out in section II of this report. The Group considered that cost-efficient and sustainable programmes, for example, electronic distance learning, should be examined for training national staff in the safe and secure storage of conventional ammunition and as a means of developing sustainable national stockpile management capacity.

D. Technical guidelines

53. National legislative and regulatory frameworks, supported by effective operational procedures, are essential for effective and efficient stockpile management of conventional ammunition. They are the indispensable basis for any form of cooperation, including, in particular, training. To a limited extent States can obtain guidance for improving their regulative systems from standards and technical guidelines developed in the framework of regional and subregional mechanisms. Effective model regulations and technical guidelines with regard to the safe transport of conventional ammunition, which would be readily available for States to incorporate into their national legislative framework, exist at the international level. In contrast, there are no global model regulations or technical guidelines for the stockpile management of conventional ammunition.

54. The Group considered that guidance documents on the management of stockpiles of conventional ammunition can greatly facilitate international cooperation. International technical guidelines for conventional ammunition stockpile management are achievable and could provide States with advice on how to incrementally improve stockpile management standards based on first principles. The Group was of the view that the United Nations could play an important role in developing such a set of "international technical guidelines for conventional ammunition stockpile management" that would be available for States to use on a voluntary basis, in developing and implementing effective stockpile management and security systems and in strengthening international cooperation and assistance.

E. Knowledge management

55. The Group also stressed that, in addition to international technical guidelines for conventional ammunition stockpile management, access by States to important technical information on conventional ammunition, including technical drawings and safety test results, was essential. Although the original manufacturer supplies

this information when conventional ammunition is initially procured, further transfers or the effects of conflict or post-conflict armed forces restructuring often mean that the information is subsequently lost. One area of particular concern is that of propellant test records, as the spontaneous combustion of propellant in storage due to autocatalytic ignition is the cause of many ammunition depot explosions. Knowledge of the stabilizer level in the propellant is essential to identify that ammunition is at risk of this phenomenon. This could require access to the country of original manufacture master propellant sample records. The Group therefore considered that wider knowledge resource management and information exchange mechanisms were essential at the international and regional levels. This could also assist States, inter alia, in identifying prospective donors and relevant assistance projects and programmes, acquire technical information and develop national project management capacity.

56. The Group noted that there is no dedicated technical capability with regard to issues relating to stockpile management of conventional ammunition within the United Nations system. While conventional ammunition in surplus impacts on the activities or operations of UNDP, the Department of Peacekeeping Operations, the United Nations Mine Action Service and the Office for Disarmament Affairs, there is no United Nations inter-agency mechanism that addresses the problems posed by conventional ammunition stockpiles in surplus, although individual agencies have developed projects in this area. This absence of in-house specialist technical capacity regarding ammunition significantly limits the operational impact that the United Nations system can make on the issue. Timely, coordinated and effective assistance to States in the area of conventional ammunition stockpile management and disposal of surplus is required. Such a capability would not only maintain a knowledge resource on the stockpile management, security and destruction of conventional ammunition, but would also act as a point of contact for quality technical advice, assistance and information. Field assessments of problems relating to surplus stocks could be supported, and technical advice and assistance on stockpile management and disposal programmes could be provided. This would ensure more systematic engagement by the United Nations system, and would be a valuable resource in support of member States.

IV. Conclusions

57. In order to enhance cooperation with regard to the issue of problems arising from the accumulation of conventional ammunition stockpiles in surplus, the Group concluded that all States and international initiatives should focus on the following priority areas.

A. Stockpile management

58. In order to improve ammunition stockpile management and the pace of current surplus conventional ammunition destruction, States should develop or improve, as appropriate, legal frameworks that govern the safe and secure storage of stockpiles of conventional ammunition. These frameworks should consider the development and maintenance of a "whole life management" approach to stockpile management in order to identify and address surpluses as they arise, improve explosive safety

standards, increase the security of stockpiles to minimize the risk of diversion, and ensure the cost-efficient use of the national stockpiles. The development or enhancement of legislative stockpile management frameworks needs to be supported by commensurate advances in effective operational and technical procedures.

59. States should pay particular attention to systematically identifying, on a priority basis, surplus or obsolete conventional ammunition stockpiles. This can be achieved through enhancing accounting systems and comprehensively monitoring national stockpiles to assess whether they meet, exceed or fall short of requirements. States should conduct destruction or demilitarization operations of unsafe or potentially unsafe ammunition in a timely manner. Conducting destruction and demilitarization operations in a safe, effective, efficient and environmentally benign manner must be a priority.

B. Awareness

60. The United Nations, relevant regional organizations and States should, as appropriate and in all relevant forums, advocate continued awareness-raising on the magnitude of the problem and, in particular, the risks and costs that arise from ineffective stockpile management of conventional ammunition as a concern in its own right. In order to improve current international understanding of the risks and hazards inherent to the storage of conventional ammunition and to create momentum for increased international cooperation, multilateral bodies and relevant regional organizations should engage more thoroughly in the issue of stockpile management and the exchange of relevant experience. Without this awareness, it will be difficult to develop appropriate international and regional responses. In particular, considering that the presence of poorly managed stockpiles of conventional ammunition poses a threat to peacekeeping operations and thus places peacekeeping personnel at serious risk, the safe and secure management of ammunition should be considered when planning and conducting peacekeeping operations.

C. Capacity-building

61. Technical guidelines for the stockpile management of conventional ammunition, which would be available for States to use on a voluntary basis, should be developed within the United Nations to assist States in improving their national stockpile management capacity and to combat the growth of conventional ammunition surpluses. These guidelines should be sequenced to allow States gradually to attain a series of progressively more comprehensive stockpile management systems, which aim to prioritize and address the most serious safety and security risks first. Following the guidelines should therefore be a gradual and realistic process, and one that is based on installing through legislation and operational practice the "first principles" of safe and secure ammunition management. The guidelines should also cover risk management and planning for the potential impact on vulnerable areas and facilities outside the perimeter of the ammunition depot, should there be an explosive event within the depot. Such guidelines could be developed under the auspices of the Office for Disarmament Affairs with the assistance of qualified experts in cooperation with other relevant United Nations offices and agencies.

62. The education and training of national stockpile management staff should receive increased attention because of the pivotal role played by these personnel in ensuring the safe and secure management of ammunition. Sustainable education and training should therefore be key elements of institutional and sustainable capacity-building, and must be a core component of all cooperation activities. When conducting institutional capacity-building projects and programmes for the destruction and demilitarization of conventional ammunition, States are also encouraged to address the training of national staff with regard to wider stockpile management issues. The development of appropriate recruitment and vetting procedures for staff should also, where appropriate, be a component of capacity-building.

63. Knowledge resource management among United Nations agencies and intergovernmental bodies should be improved to ensure that States have ready access to appropriate technical expertise and guidance for the safe and secure storage of ammunition and the disposal of surplus stockpiles. At present, there is no easily accessible repository or contact point for technical information on stockpile management available to interested States. The Group recommends increased coordination between United Nations offices and agencies within the United Nations system in providing information on stockpile management issues and to direct States to the appropriate sources of expertise should they require assistance. The Group further recommends that close links be forged between such inter-agency cooperation and other regional and subregional bodies outside the United Nations framework.

D. International assistance

64. States should strengthen their support for projects and programmes to improve stockpile management, and, in this context, the destruction and demilitarization of conventional ammunition stockpiles in surplus. States should select the appropriate assistance partnership that is best suited to their circumstances. In weighing the comparative advantages of a partnership, States should pay particular attention to, inter alia, the time frame, the scope of assistance, the potential for the division of labour between a number of partners, and the financial and environmental costs of implementation. Regional and subregional bodies often appear to be suited to facilitate larger programmes on stockpile management and surplus disposal. They also have a role to play in the development of information-sharing mechanisms, where appropriate and within national legislative constraints, that improve access to knowledge and support national stockpile management capacity.

V. Recommendations

65. The following recommendations are intended to form a mutually reinforcing set of measures, which could be undertaken at the national, regional and global levels, to address the accumulation of conventional ammunition stockpiles in surplus.

A. National

66. States should address stockpile management issues in a comprehensive manner and develop or improve, as necessary or appropriate, legislative and regulatory frameworks that govern the safe and secure storage of stockpiles of conventional ammunition.

67. States should strengthen their support for projects and programmes to improve stockpile management and, in this context, the destruction and demilitarization of conventional ammunition stockpiles in surplus.

68. States should pay particular attention to systematically identifying, on a priority basis, surplus or obsolete conventional ammunition stockpiles.

69. States should conduct destruction or demilitarization operations of unsafe or potentially unsafe ammunition in a timely, safe and environmentally benign manner.

B. Regional

70. Multilateral bodies, in particular relevant regional organizations, should cooperate more thoroughly on the issue of stockpile management and the exchange of relevant information and experience, where appropriate and consistent with relevant legal frameworks of participating States.

71. Within sustainable capacity-building, key elements such as education and training should be core components of all cooperation activities.

C. Global

72. Technical guidelines for the stockpile management of conventional ammunition, which would be available for States to use on a voluntary basis, should be developed within the United Nations, under the auspices of the official development assistance, to assist States in improving their national stockpile management capacity, preventing the growth of conventional ammunition surpluses and addressing wider risk mitigation.

73. Knowledge resource management on ammunition technical issues within the United Nations system should be improved to ensure that States have ready access to appropriate technical expertise and guidance for the safe and secure storage of ammunition and the disposal of surplus stockpiles.

74. The safe and secure stockpile management of ammunition should be an essential component to be considered in planning and conducting peacekeeping operations.

VI. Procedural matters

75. In paragraph 7 of its resolution 61/72, the General Assembly requested the Secretary-General to establish a group of governmental experts, no later than 2008, to consider further steps to enhance cooperation with regard to the issue of

conventional ammunition stockpiles in surplus, and to transmit the report of the group of experts to the General Assembly for consideration at its sixty-third session.

76. Accordingly, on 31 October 2007, the Secretary-General appointed a Group of Governmental Experts from the following 17 States: Bangladesh, Bolivia, Cameroon, Chile, China, Czech Republic, France, Germany, Morocco, Norway, Peru, Republic of Korea, Russian Federation, Serbia, South Africa, United Kingdom of Great Britain and Northern Ireland and the United States of America. The full list of Governmental Experts is contained in annex 2 to the present report.

77. The Group of Governmental Experts conducted its work in three sessions of one week duration each. The first session was held in Geneva from 14 to 18 January 2008. The second and third sessions were held in New York from 30 March to 4 April and from 7 to 11 July 2008. At its first session, the Group unanimously elected as its Chairperson Michael Hasenau.

78. The Group received contributions from a number of independent experts and representatives from relevant civil society organizations and international organizations on issues relevant to the problems arising from the accumulation of conventional ammunition stockpiles in surplus. The Group interacted, inter alia, with representatives of the International Action Network on Small Arms, the World Forum on the Future of Sport Shooting Activities, the Department of Peacekeeping Operations, UNDP, UNMAS, the Security Council Al-Qaida and Taliban sanctions Committee Analytical Support and Sanctions Monitoring Team.

79. The Group took into account various relevant documents relating to the stockpile management, security and disposal of conventional ammunition, issued by regional, subregional and other multilateral organizations, as well as relevant materials issued by civil society organizations and authoritative experts on the accumulation of conventional ammunition stockpiles in surplus. These documents are referenced in the appropriate paragraphs of the report. A list of existing regional and multilateral instruments and arrangements, including technical agreements, standards and guidelines, relating to the issue of conventional ammunition stockpiles in surplus, is attached as annex 1 to this report.

Annex 1

Existing regional and multilateral instruments and arrangements, including technical agreements, standards and guidelines, relating to the issue of conventional ammunition stockpiles in surplus

International

International Air Transport Association, *IATA Dangerous Goods Regulations* 49th edition (Geneva, 2008)

International Civil Aviation Organization, *ICAO Technical instructions for the Safe Transport of Dangerous Goods by Air*, annex 18 (Doc 9284) (Montreal, 2008)

International Maritime Organization, IMO International Maritime Dangerous Goods Code (IMDG) (London, 2002)

Economic Commission for Europe, United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS) (ST/SG/AC.10/30/Rev.2) (Geneva, February 2007)

General Assembly resolution 55/255: Protocol against the Illicit Manufacturing of and Trafficking in Firearms, Their Parts and Components and Ammunition, supplementing the United Nations Convention against Transnational Organized Crime

Economic Commission for Europe, *Recommendations on the Transport of Dangerous Goods: Model Regulations* (ST/SG/AC.10/1/Rev.15) (Geneva, July 2007)

Regional

Andean Community Plan to Prevent, Fight and Eradicate Illicit Trafficking in Small Arms and Light Weapons in all its Aspects, Decision 552 (Quirama, 11 March 2003)

Economic Community of West African States Convention on Small Arms and Light Weapons, Their Ammunition and Other Related Materials (Abuja, 14 June 2006)

Regulations concerning the International Carriage of Dangerous Goods by Rail (RID), Convention concerning International Carriage by Rail (COTIF), appendix B, annex 1 (1 January 2005)

Nairobi Protocol for the Prevention, Control and Reduction of Small Arms and Light Weapons in the Great Lakes Region and the Horn of Africa (Nairobi, 21 April 2004)

NATO Allied Ammunition Storage and Transportation Publication (AASPT) 1-4 — Manual of NATO Safety Principles for the Storage, Transport, Hazard Classification and Safety Risk Analysis of Ammunition and Explosives (Brussels, 1995-2006)

Organization of American States Inter-American Convention against the Illicit Manufacturing of and Trafficking in Firearms, Ammunition, Explosives, and Other Related Materials (CIFTA) (Washington D.C., 14 November 1997)

Organization for Security and Cooperation in Europe Document on Stockpiles of Conventional Ammunition, FSC.DOC/1/03 (Vienna, 19 November 2003)

Protocol on the Control of Firearms, Ammunition and Other Related Materials in the Southern African Development Community (SADC) Region (14 August 2001)

Annex 2

List of governmental experts appointed by the Secretary-General to consider further steps to enhance cooperation with regard to the issue of conventional ammunition stockpiles in surplus

Ambassador José Antonio BELLINA ACEVEDO
Director General of International Relations
Ministry of Defence
Lima

Kai CHEN (Third session)
Director
Department of Arms Control and Disarmament
Ministry of Foreign Affairs
Beijing

Rasim CIRIKOVIC (Third session)
Lieutenant Colonel
Ministry of Defence
Belgrade

Steven COSTNER
Deputy Director
Office of Weapons Removal and Abatement
Department of State
Washington, D.C.

Ahmed EL OMARI (Third session)
Counsellor
Permanent Mission of the Kingdom of Morocco
to the United Nations
New York

Francisco GARCÍA AYLLON (First session)
Colonel DAEM
Representative of the Vice-Minister of National Defence
Ministry of National Defence
La Paz

Gonzalo Freddy GUZMÁN ARANÍBAR (Second and third sessions)
Colonel DAEM
Representative of the National Defence
Ministry of National Defence
La Paz

Michael HASENAU
Deputy Head
Conventional Arms Control Division
Federal Foreign Office
Berlin

Pascal JEANMOUGIN
Lieutenant Colonel
General Staff
French Verification Unit
Ministry of Defence
Paris

Yong KANG (Second session)
Counsellor
Disarmament and Non-Proliferation
Permanent Mission of the People's Republic of China
to the United Nations
New York

Yong Ho KIM
Counsellor
Permanent Mission of the Republic of Korea
to the United Nations
Geneva

Ambassador Alfredo LABBÉ (Second and third sessions)
Deputy Permanent Representative
Permanent Mission of Chile to the United Nations
New York

Petr LITAVRIN
Deputy Director
Department for Security and Disarmament
Ministry of Foreign Affairs
Moscow

Shengkun MA (First session)
Division Director
Department of Arms Control and Disarmament
Ministry of Foreign Affairs
Beijing

Odd Berner MALME
Counsellor (Police Adviser)
Permanent Mission of Norway to the United Nations
New York

Masud Bin MOMEN
Director-General (United Nations)
Ministry of Foreign Affairs
Dhaka

Ferdinand NGOH NGOH (First and third sessions)
Minister Counsellor
Permanent Mission of Cameroon
to the United Nations
New York

Guy POLLARD (First session)
Second Secretary
Permanent Mission of the United Kingdom
to the Conference on Disarmament
Geneva

Rachid SEMRISSE (First and second sessions)
Lieutenant Colonel
Royal Armed Forces/Division of Munitions
Ministry of National Defence
Rabat

Josef VITEK
Disarmament Desk Officer
Ministry of Foreign Affairs
Prague

Rob WENSLEY
Deputy Director
Conventional Arms
Department of Foreign Affairs
Pretoria

Andrew WOOD
Head of Export Control Policy, Counter-Proliferation
and Arms Control
Ministry of Defence
London

Annex 3

List of ammunition demilitarization techniques[a]

Process operation	*Remarks*	*Technology*	*Advantages*	*Disadvantages*
Pre-processing operations				
Manual disassembly	The use of human resources to physically dismantle ammunition by manual labour using simple hand tools.	• None	• Low capital investment	• Labour intensive • Low production rates
Mechanical disassembly	The use of mechanically operated systems to dismantle ammunition. Some of the available technologies are shown in the table, but systems tend to be specifically designed to deal with each different type of munition.	• Pull apart • Defusing • Depriming	• High production rates • Lower staff requirements	• Medium capital investment
Robotic disassembly	A fully automated disassembly system; this system would only be economically efficient for very large production runs due to the high start-up costs.	• Ammunition dependent	• High production rates • Lower staff requirements	• High capital investment • Reliability
Mechanical breakdown	This process is mainly concerned with techniques required to expose the explosive fillings of ammunition prior to the destruction phase.	• Bandsaw • Guillotine • Cracker mill • Rock crusher • Punch	• Lower staff requirements • Medium production rates • No secondary waste stream at this phase of the demilitarization cycle	• Explosive safety risks of initiation • Medium capital investment • Wide range of equipment required to deal with all ammunition types

Process operation	*Remarks*	*Technology*	*Advantages*	*Disadvantages*
Cryofracture	This process is used to break down ammunition into small enough pieces to be processed through an incineration destruction method. The liquid nitrogen changes the mechanical properties of the munition casing to a more brittle phase by cooling it to -130°C. The munition can then be easily shattered using simple mechanical shear or press techniques.	• Liquid nitrogen cooling	• Environmentally benign • High production rates • Can be used for virtually all ammunition types • Low capital investment for equipment • No secondary waste stream at this phase of the demilitarization cycle	• Large process area requirements • Costs of liquid nitrogen • Health and safety issues for staff • Unpredictable results for fracture forces necessary
Hydro-abrasive cutting	The use of water and abrasives at pressures from 240 to 1,000 BAR to cut open ammunition by an erosive process.	• There are two types of systems: "Entrainment" or "Direct Injection (DIAJET)" • These differ in the way that the abrasive is fed into the water flow and the suspension of the abrasive particles in the water	• Lower staff requirements • Can be used for virtually all ammunition types • Safety	• High capital investment • Complex filtration systems for wastewater required • Grit sensitivity of explosive after cutting
Destruction operations				
Explosive removal		• Hot steam melt out	• Simplicity	• Low capital investment • Restricted to certain explosive types
		• Microwave melt out	• Efficiency • Low secondary waste stream	• High capital investment • Developing technology

Process operation	*Remarks*	*Technology*	*Advantages*	*Disadvantages*
Incineration	The kiln is made up of four 1.6 metres long, 1 metre outer diameter retort sections bolted together. The 6 to 8 cm thick walls of the kiln are designed to withstand small detonations. The kiln contains internal spiral flights, which move the waste in an auger-like fashion through the retort as the kiln rotates.	• Rotary kiln furnace	• Efficiency • Low staff requirements • High production rates	• Limited to small calibre ammunition, propellant and pyrotechnics • Significant pre-processing required for larger calibres • Small arms ammunition lead residue and pyrotechnic effluent can pose considerable environmental problems
Incineration	Used to destroy small amounts of explosive or explosive residue left after flush-out pre-processing techniques. It can also be used to destroy explosively contaminated packing material, etc.	• Car bottom furnace (so named because it uses a small rail car to move material into the furnace)	• Ideal for explosive residue • Low staff requirements	• Medium capital investment • Cannot destroy most ammunition types • It is a system to support destruction, and not a system in its own right
	A static high temperature kiln	• Hearth kiln furnace	• Low staff requirements • Medium production rates	• Limited ammunition types possible
	A Plasma torch, at temperatures in the region of 4,000°C to 7,000°C, is used to heat a container into which waste products are fed. The plasma is an ionized gas at an extremely high temperature, which is used to initiate rapid chemical decomposition by the action of this extreme heat. The material is	• Plasma arc furnace	• Low staff requirements • High production rates	• High capital investment • High power requirement • Developing technology • Pre-processing still required

Process operation	*Remarks*	*Technology*	*Advantages*	*Disadvantages*
	currently fed in a slurry form, although research is ongoing for the destruction of entire munitions.			
Contained detonation	The destruction of ammunition and explosives by detonation in an enclosed chamber; the evolving gases are then processed by an integral pollution control system.	• Chambers of up to 20 kg are readily available; larger chambers exist, but are heavy and costly	• Limited pre-processing requirements • Can deal with many ammunition types • Medium production rates	• Medium staff requirements • High donor explosive requirements • Medium capital investment • Explosive content limited
Pollution control systems[b]				
Volatile Organic Compound (VOC) destruction	This oxidizes entrained organic compounds, ash and metal fragments. In order to achieve this, it must operate above 850°C for over 2 seconds to destroy VOC; the VOC then burn to CO_2, H_2O and acid gas. All organic particulate is destroyed.	• Afterburner	• Proven technology • Very low staff requirements	• High fuel requirements
Acid gas neutralization	Produces safe and inert solids such as sodium chloride (common salt), sodium sulphate and sodium nitrate for disposal.	• Addition of sodium bicarbonate	• Operates over wide temperature range • Produces safe and inert solid waste • Reacts well with nitrogen oxides • Readily available	• Large supplies necessary
Particulate removal	The baghouse system uses large heat-resistant fabric bags to filter particulate.	• Baghouse	• Simple and cheap technology	• Prone to baghouse fires • Filtration efficiency • Medium capital investment

Process operation	*Remarks*	*Technology*	*Advantages*	*Disadvantages*
	Dry ceramic filtration is now regarded as one of the most efficient filtration systems currently available; it has the capability to remove particulate matter down to one micron.	• Dry ceramic filtration	• Fire resistant • Filters down to one micron • Supports a bed of sorbent for improved gas adsorption	• Medium capital investment
		• Liquid filtration	• Filtration efficiency	• High capital investment • Liquid waste stream requires further processing
Scrap processing operations				
Scrap processing		• Crusher		System requirements depend on waste stream from destruction process. There are many systems available.
		• Shredder		
		• Compacter/cracker		

[a] Other technologies, such as molten salt oxidation, biodegradation, etc., are developing, but production facilities are very limited and the technology is still to be universally proven.

[b] A pollution control system (PCS) that meets European Union environmental emission limits requires a combination of the technologies shown.